



Declaration of Conformity



Type of equipment: NVR
Brand Name /Trade Mark: SAMSUNG
Type designation /model: SRN-1673SP
Applicant: Samsung Techwin Co., Ltd.

In accordance with the following Directives:

2004/108/EC The Electromagnetic Compatibility Directive
Including amendments by the CE Marking Directive 93/68/EEC

2011/65/EU Restriction of the use of certain hazardous substances in electrical and
electronic equipment (recast)

The following harmonized European standards or technical specifications have been applied:

EN 55022:2010	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
EN 55024:2010	Information technology equipment-Immunity characteristics-Limits and methods of measurement
EN 61000-4-2:2009	Electrostatic discharge immunity test
EN 61000-4-3:2006+A2:2010	Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4:2012	Electrical fast transient/burst immunity test
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields

The CE Marking on the products and/or their packaging signifies that SAMSUNG TECHWIN CO., LTD. holds the reference technical file available to the European Union authorities.

Place and date of issue: 84, Jeongdong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea
/ Mar 13, 2015

Authorized Signatory: Name : Jei Soon, Kang
Title : Principal Research Engineer

Signature :

CE Conformance EMC Test Report

Test Report No. : KES-E1-15T0067
Date of Issue : 03.13. 2015
Description of Product : NVR
Model No. : SRN-1673SP
Variant Model : -
Applicant : Samsung Techwin Co., Ltd.
Address : 84, Jeongdong-ro, Sengsan-gu, Changwon-si, Gyeongsangnam-do, Korea
Manufacturer : TIANJIN SANSUNG TECHWIN OPTO-ELECTRONIC CO.,LTD
Address : No.11 Weiliu Road. Micro-Electronic Industrial Park Jingang Road Tianjin 300385, China
Applicable Regulation : **EMC Directive 2004/108/EC**
EN 55022:2010
EN 50130-4:2011
EN 61000-3-2:2006+A1:2009+ A2:2009
EN 61000-3-3:2008

Date of Receipt : 02. 24. 2015
Test Date : 03. 03. 2015 ~ 03. 06. 2015

Tested by:Tae Yeon, Kim
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Revision history

Revision	Date of issue	Test report No.	Description
-	03. 13. 2015	KES-E1-15T0067	Initial

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1. General Information

1.1 Introduction

The EMC Test Report for CE Declaration of Conformity is prepared on behalf of named applicant in accordance with the EMC Directive(2004/108/EC) of the European Economic Community. The test results reported in this document relate only to the item that was tested.

All radiated emission, conducted emission measurements required by the EMC Directive were performed manually at KES Co., Ltd. (here in after called KES), 473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, 469-803 KOREA.

The radiated emission measurements performed on 10 meter, Open Area Test Site, test range maintained by KES. Complete ANSI63.4;2009 description and site attenuation measurement data records are maintained at the test facility and have been placed on file with the Federal Communications Commission.

All immunity measurements required by the EMC Directive were performed manually at KES Co., Ltd. (here in after called KES), 473-29, Gayeo-ro, Yeoju-si, Gyeonggi-do, 469-803 KOREA.

The immunity measurements were performed in a shielded enclosure and/or anechoic chamber also located at the same facility.

The KES EMC test facilities in Yeoju-si are designated testing laboratory according to ISO/IEC 17025 by Radio Research Agency(RRA), Korea Communication Commission.



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1.2 Product Description for Equipment Under Test (E.U.T)

Samsung Techwin Co., Ltd., NVR, Model No: SNV-1673SP or the "E.U.T" as referred to in this report is base model.

Main Specifications of EUT are:

Network Camera		Inputs	Max. 16CH
		Resolution	CIF ~ 8MP
		Fish-Eye Dewarping	N/A
		Protocols	Samsung, ONVIF
Live	Local Display	HDMI/VGA	
	Multi-Channel Display	[LocalMonitor]1/4/6/8/9/13/16/AutoSequence [Web]1/4/9/16/AutoSequence	
	Performance	[LocalMonitor] 8MP(20fps) 5MP(30fps),3MP(50fps),2MP(150fps),720p(240fps),D1(480fps) [Web] 5MP(30fps),3MP(60fps),2MP(120fps),720p(240fps),D1(480fps)	
Performance			
Operating System		Linux	
Record	Embedded Compression		H.264, MJPEG
	Recording Bandwidth		80Mbps, 2MP 16camera real-time recording
	Resolution		CIF ~ 8MP
	Type		Normal, Scheduled, Event (Pre/Post)
	Event Trigger		-AlarmInput(8) -VideoLoss -CameraEvent(Alarm-In,MD,VideoAnalytics) -VAEvent(Tampering,Enter/Exit,Passing(Virtual-Line,Appearing/Disappearing, Face Detection, Audio Detection)
	Event Action		e-Mail, PTZ Preset, Alarm Out, Buzzer, Monitor Out
Search & Play	Playback Bandwidth		(32Mbps) Max.3Users
	Performance		32Mbps
	Mode		Date&Time(Calendar) EventLoglist SmartSearch(PlaybackSearch,UpgradeAug.'15) TextSearch(POS)
	Simultaneous playback		[LocalMonitor]Upto16CH [Web,CMS]Upto16CH
	Resolution		CIF ~ 8MP
Fish-Eye Dewarping		N/A	
Playback Control		Fast Forward/Backward, Move one step up/down	
Storage	Default Built-In		1TB
	Internal		4 SATA
	Hot Swap		No(Cold-Swap at Front)
	External(DAS)		1 e-SATA
	External(NAS, iSCSI)		N/A
	Max.Capacity		Internal (16TB=4x4TB)
	RAID		N/A
	File backup		BU/EXE(USB), JPG/AVI(Web, CMS)
Function		Max. 16CH Play, Date-Time/Title display	
Sensor	I/O		8/4 (NO 3EA, NO/NC 1EA)
Audio	Input		16CH (network)
	Compression		G.711, G.726, AAC(16/48KHz)
	Audio Communication		2-Way
Network			
Protocol			TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTSP, NTP, HTTP, DHCP(Server, Client), PPPoE, SMTP, ICMP, ARP, DNS, DDNS, uPnP, HTTPS, SNMP, ONVIF Profile S
DDNS			Samsung iPolis DDNS
Transmission Bandwidth			Max 160Mbps
Max Remote Users			Search(3) / Live unicast(10) / Live multicast(20)
IP Version			IPv4/v6
Security			UseraccessLog
			IPFiltering
			802.1x Encryption(ID/PW,Recording,Transmission,Backup)
Language	GUI	(1)English,(2)French,(3)German,(4)Italian,(5)Spanish, (6)Russian,(7)Turkish,(8)Polish,(9)Dutch,(10)Swedish, (11)Czech,(12)Portuguese,(13)Danish,(14)Rumanian,(15)Serbian, (16)Croatian,(17)Hungarian,(18)Greek,(19)Norwegian,(20)Finnish, (21)Korean,(22)Chinese,(23)Japanese,(24)Thai	
	Web	(1)English,(2)French,(3)German,(4)Italian,(5)Spanish, (6)Russian,(7)Turkish,(8)Polish,(9)Dutch,(10)Swedish, (11)Czech,(12)Portuguese,(13)Danish,(14)Rumanian,(15)Serbian, (16)Croatian,(17)Hungarian,(18)Greek,(19)Norwegian,(20)Finnish, (21)Korean,(22)Chinese,(23)Japanese(24)Thai	
OS			Supported OS : Window XP(service pack 2 or above), Vista, 7, 8, Mac OS X(10.6 or above)

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Web Browser		MicrosoftInternetExplorer(최신보안및버그패치적용Ver.8-10, IE9이상권장) MozillaFirefox(Ver.19.xorabove), GoogleChrome(Ver.26.xorabove), AppleSafari(최신보안및버그패치적용Ver.6.0.3)
Viewer Software	Type	SSM, Webviewer, Smart Viewer, iPolis Mobile Viewer
	CMS Support	Support SDK/CGI(SUNAPI)
Functions		
Camera Setup	Register	1) PnP mode 2) Manual
	Setup Items	(1)IPAddress,AddProfileEdit,Bitrate,Compression,GOP,Quality (2)CameraEventSetup - MD - VA (Upgrade Aug. 2015) : Tampering, Enter/Exit, Passing(Virtual- Line), Appearing/Disappearing, Face Detection, Audio Detection) (3)VideoSetup(SimpleFocus,Brightness/Contrast,Flip/Mirror,IRIS, WDR, D&N, SSNR, Shutter, SSDR, DIS)
Camera Control	PoE	1)MonitorPoEPowerconsumption 2)On/OffControlforeachPoEcamera 3)RemoteResetforeachPoEcamera
Easy Configuration		SetupWizard (Date/Time,Network,AutoCameraConfiguration)
Backup from SD Card in camera		Upgrade(Aug. 2015)
PTZ	Control	Via GUI, Webviewer, SPC-2000
	Preset	255
Smart phone	Support Model	Android / iOS
	Control	Live(4CH):(4DIV)CIFMonitoring (4/1DIV)1.3MPMonitoring Playback(1CH):Upto1.3MP
System Control	Control Applications	Mouse, IR Remocon, Web, SPC-2000(USB Controller)
	SSM-VM Compatibility	N/A
Indicator/Interface		
Front	Indicator	PowerStatusLED1EA HDDActionLED1EA AlarmStatusLED1EA RecordStatusLED1EA NetworkActionLED1EA BackupLED1EA
	USB	2EA (Front 1EA, Rear 1EA)
Connectors	Power Switch	N/A
	VGA	1EA
	HDMI	1EA
	Audio	Out(1 EA, RCA, Line)
	DVD	N/A
	Serial	N/A
	Ethernet	■16EA(PoE,100Mbps) - 8 hPoE when 2 PoE ports aggregated to 1 port ■2EA(LAN/WAN,1Gbps) - LAN : Downlink to Camera/PoE Hub - WAN : Uplink to CMS
	Alarm	In(8EA,TerminalBlock) Out(4EA,TerminalBlock)
	Reset	Yes (Factory Reset, Alarm Reset)
Power Cord		Included
System		
Log	Log List	Max. 20000 (System Log, Event Log each)
Environmental		
Operating Temperature / Humidity		+0° C to +40° C
Humidity		20% ~ 85%
Electrical		
Power Input		100 ~ 240V AC
Power Consumption		Set:66W(NVRw/4xHDD) PSE:Total200W (Average12.5WpereachPoEport)
Mechanical		
Color / Material		Black / Metal
Dimension (WxHxD)		440*88*384.8 (2U)
Weight		5.6kg
Accessories		
IR Remocon		Included
Mouse		Included
Viewer CD		Backup Viewer, Installation Manual
IB		Included
Power Cord		Included
Power Adaptor		N/A
Terminal Block		Included
Standards		
Regulation		R82(France), EN50132
Approvals	Safety	UL,KC
	EMC	CE, FCC, KCC, CCC, Gost-R

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1.3 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NVR	SNV-1673SP	-	TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO., LTD	EUT
Mouse	MOEIUOA	-	Dongguan Primax Electronic & Telecommunication Products Ltd.	

1.4 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Monitor1	M1962DL	010NDTC5Z497	LG Electronics Nanjing Display Co., Ltd.	
Monitor2	I2269VWM	BEWD39A000147	L&T Display Technology(Fujian) LTD.	
Notebook	RT3290LE	5CD242B042	HP	
AC/DC ADaptor	Series PPP009L-E	WCNWVOA3U3G6FB	LITE-ON TECHNOLOGY (CHANGZHOU) Co., Ltd.	
Speaker	MS-760		MASS	
Ext.HDD	MDY-US2528	-	Q-DRIVER	
AC/DC ADaptor	SK02G-0500200K	-	Shenzhen Simsukian Electronics Technology Co., Ltd.	
POE CAMERA	SND-L6083R	-	SAMSUNG TECHWIN CO., LTD	
JIG1	-	-	-	
JIG2	SIE-0001 D0		SAMSUNG TECHWIN CO., LTD	

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**1.5 External I/O Cabling**

Start		End		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NVR	HDMI	Monitor1	DVI	1.0	Shielded
	D-SUB	Monitor2	D-SUB	1.5	Shielded
	POE CAMERA	POE Camera	RJ-45	3.0	Unshielded
	POE CAMERA (2-16)	Termination	OPEN	1.1	Unshielded
	RJ-45	Notebook	RJ-45	3.0	Unshielded
	USB	Mouse	USB	1.8	Shielded
	eSATA	Ext.HDD	eSATA	0.9	Unshielded
	RCA	Speaker	RCA	1.0	Unshielded
	ALARM	JIG1	WIRE	3.0	Unshielded
	ALARM	JIG2	WIRE	3.0	Unshielded

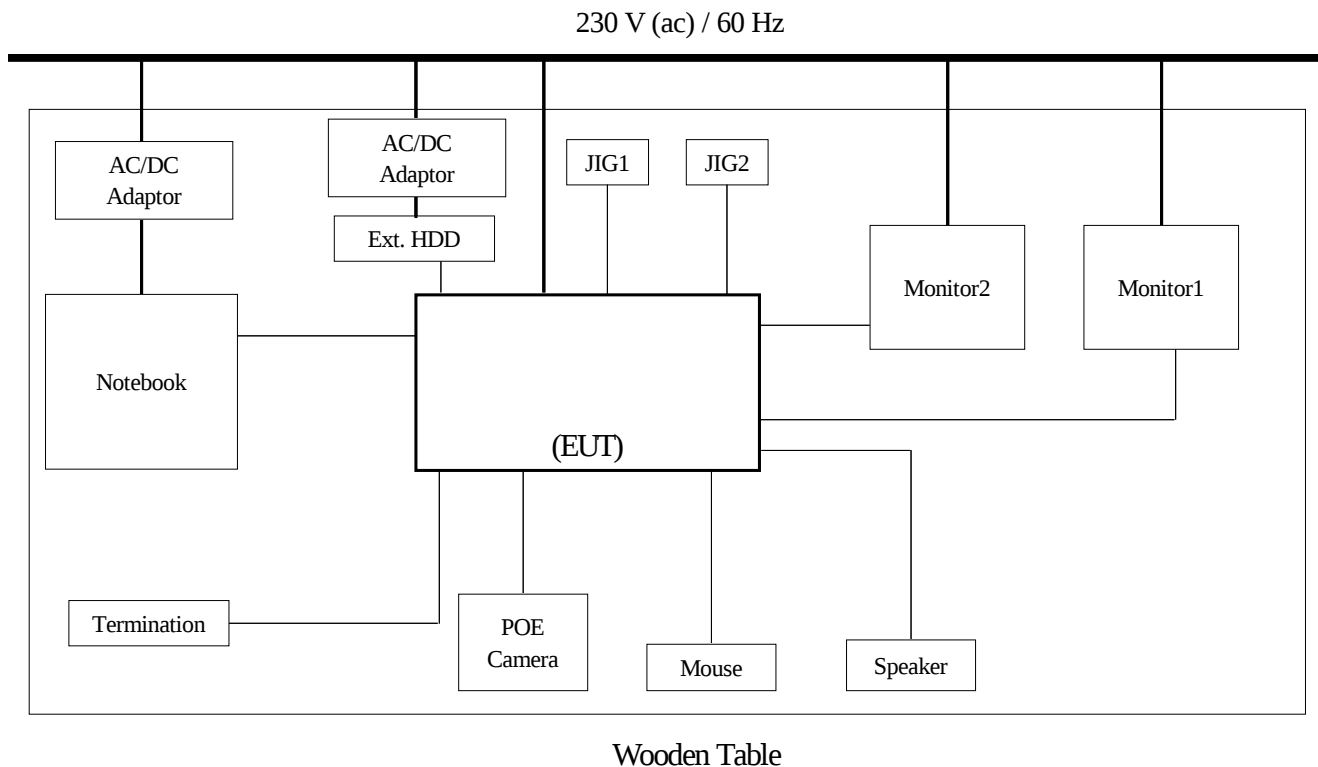
1.6 Special Accessories

As shown in section 1.8, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers.

1.7 E.U.T Modifications

No modifications were made to the E.U.T in order to achieve and maintain compliance to the standards described in this report.

1.8 Configuration of Test System



1.9 Operating condition :

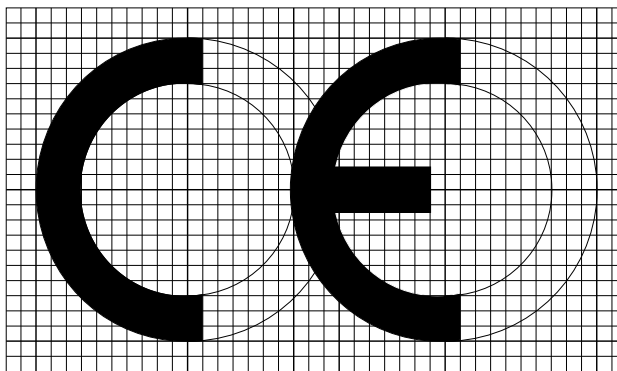
- Ping test
- web view monitoring
- Alarm test

2. Product Labelling Requirements

2.1 CE Mark

The CE Conformity Marking must consist of the initials "CE" in the stylized font and proportional to the dimensional requirements shown in following figure. Regardless of its size, the symbol must retain the specified proportionality.

The Various components of the CE Marking must have substantially the same vertical dimensions, and shall not be less than 5mm in height.



Radius of Outer Circle 100 units
Radius of Inner Circle 70 units
Stroke Width 30 units
Length of Bar 85 units
Axis to Axis 170 units
Minimum Height 5.0 mm

2.2 Statements and User Information

Equipment classification, Class (A)

Directives in which conformance is claimed Applicable EN standards

Transitional provisions Class A equipment shall also include the following statement:

Warning:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

3. Applicable Regulations

3.1 Emission

EN 55022:2010/CISPR22 are the applicable regulations that apply to Information Technology Equipment. The intention of these standards, is to establish uniform requirements for the radio disturbance level of the equipment contained in the scope, to fix limits of disturbance, to describe method of measurement and to standardize operation conditions and interpretation of the results.

EN 55022:2010/CISPR22 defines Information Technology Equipment (ITE) as follows:

Any equipment which has a primary function of either (or a combination of) entry, storage, display, retrieval, transmission, processing, switching, or control, of data and of telecommunication message and which may be equipped with one or more terminal ports typically operated for information transfer.

Any equipment with a rated supply voltage not exceeding 600 V (ac)

3.2 Immunity

EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such

Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

- (a) there is no permanent damage or change to EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
- (b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and
- (c) there is no observable deterioration of the picture at 1 V/m.

Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the application of discharge is permissible, providing

That there is no residual is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change,

and no such flickering of indicators occurs at $U = 130 \text{ dB}\mu\text{V}$.

For component of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:

- (a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
- (b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could still be used; and
- (c) there is no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.

Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for the functional test, after the conditioning.

**4. Test standards and results**

STANDARDS		LIMIT	RESULTS
EN 55022	Conducted Emission on AC mains Port	Refer to EN 55022	PASS
	Conducted Emission on Telecommunication Port	Refer to EN 55022	PASS
	Radiated Emission	Refer to EN 55022	PASS
EN 61000-3-2	Harmonic Current Emission on AC Mains Input Port	Refer to EN 61000-3-2	PASS
EN 61000-3-3	Voltage Fluctuations and Flicker on AC Mains Input Port	Refer to EN 61000-3-3	PASS
EN 50130-4	Electrostatic Discharge Immunity	Refer to EN 61000-4-2	PASS
	Radio-frequency electromagnetic field Amplitude modulated Immunity	Refer to EN 61000-4-3	PASS
	Fast Transients Immunity	Refer to EN 61000-4-4	PASS
	Surges Immunity	Refer to EN 61000-4-5	PASS
	Radio-frequency common mode Immunity	Refer to EN 61000-4-6	PASS
	Voltage Dips, Voltage Interruptions Immunity	Refer to EN 61000-4-11	PASS
	Voltage Variations Immunity	Refer to EN 50130-4	PASS

※ Note.

5. Test Performed

5.1 Conducted Emission Measurements

5.1.1 Test Description

The power line conducted emission measurements were performed in a shielded enclosure. The E.U.T was placed on a wooden table, 80 centimeters height above the floor. Power was fed to the E.U.T through a 50 ohm/ 50 micro henry Line Impedance Stabilization Network (LISN). The ground plane that was electrically bonded to the shield room ground system and all power lines entering the shield room were filtered.

5.1.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
EMI Receiver/Signal Analyzer	Narda S.T.S / PMM	PMM 9010F	020WW31006	04. 04. 2015
LISN	R&S	ENV216	101137	02. 10. 2016
LISN	EMCO	3810/2	2228	-
8-Wire ISN CAT3	Schwarzbeck Mess	CAT3 8158	8158-0019	04.08.2015
8-Wire ISN CAT5	Schwarzbeck Mess	NTFM 8158	8158-0030	05.21.2015
8-Wire ISN CAT6	Schwarzbeck Mess	NTFM 8158	8158-0029	08.15.2015
Electro wave Shieldroom	SEMITEC	-	-	-

5.1.3 Test Environments

Ambient Temperatures	Relative Humidity
see the data	see the data

5.1.4 Test Limits

- AC Main

Frequency (MHz)	EN 55022			
	Class B (dB/μV)		Class A (dB/μV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	66.0 to 56.0	56.0 to 46.0	79.0	66.0
0.50 to 5.00	56.0	46.0	73.0	60.0
5.00 to 30.00	60.0	50.0	73.0	60.0

- Telecommunication

Frequency (MHz)	EN 55022(Voltage)			
	Class B (dB μ V)		Class A (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	84.0 to 74.0	74.0 to 64.0	97.0 to 87.0	84.0 to 74.0
0.50 to 30.00	74.0	64.0	87.0	74.0

Frequency (MHz)	EN 55022(Current)			
	Class B (dB μ A)		Class A (dB μ A)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.50	40.0 to 30.0	30.0 to 20.0	53.0 to 43.0	40.0 to 30.0
0.50 to 30.00	30.0	20.0	43.0	30.0

5.1.5 Test Procedure

The conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emission exceed the average limit with the instrument set to the quasi-peak mode, the measurements are made in the average mode. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and have been recorded. Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with the E.U.T exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the HOT side and NEUTRAL side, herein referred to as H and N, respectively.

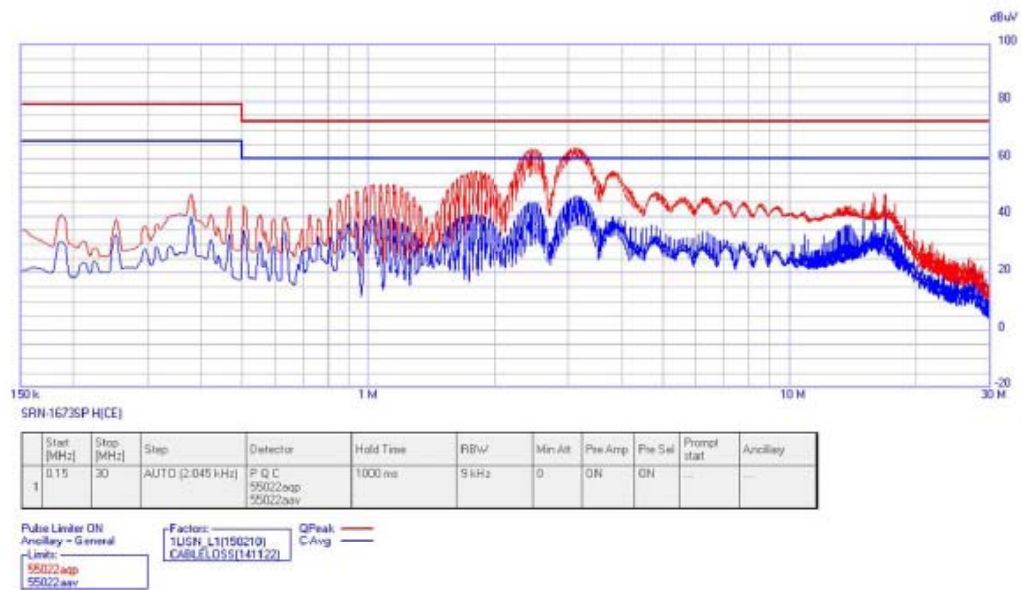
5.1.6 Test Results

According to the data in section 5.1.7, the E.U.T complied with the EN 55022/CISPR22 standards.

5.1.7 Test Data

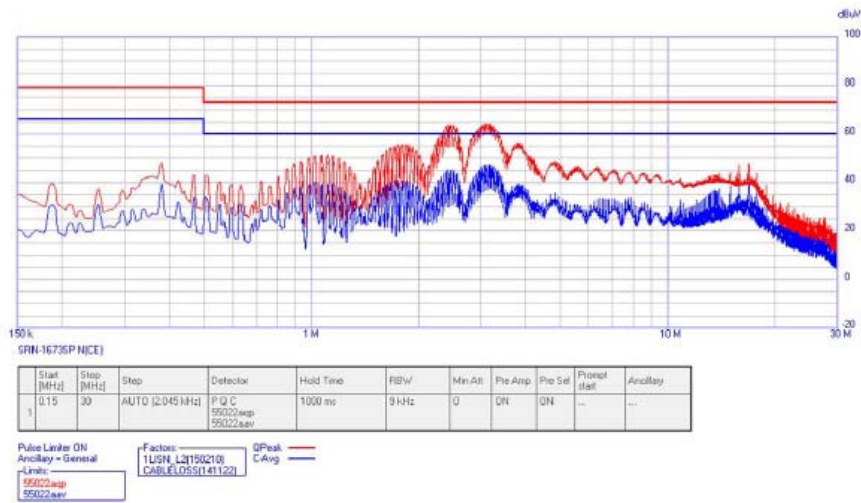
* AC Power

Temperature: 23.4 °C Humidity: 33.7 % R.H. Test Date: 03. 05. 2015 Tested by: Tae Yeon, Kim
Polarization: HOT



H								
Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (LISN) [dB]	Factor (Cable Loss) [dB]
0.187	40.110	79.000	-38.890	31.050	66.000	-34.950	9.650	0.030
0.359	40.680	79.000	-38.320	27.130	66.000	-38.870	9.650	0.030
0.379	47.620	79.000	-31.380	39.370	66.000	-26.630	9.650	0.030
0.467	43.180	79.000	-35.820	33.540	66.000	-32.460	9.650	0.030
2.303	60.020	73.000	-12.980	42.100	60.000	-17.900	9.660	0.080
2.471	63.670	73.000	-9.330	44.930	60.000	-15.070	9.660	0.090
2.817	57.600	73.000	-15.400	39.610	60.000	-20.390	9.670	0.100
3.066	63.720	73.000	-9.280	46.530	60.000	-13.470	9.670	0.110

Polarization: NEUTRAL



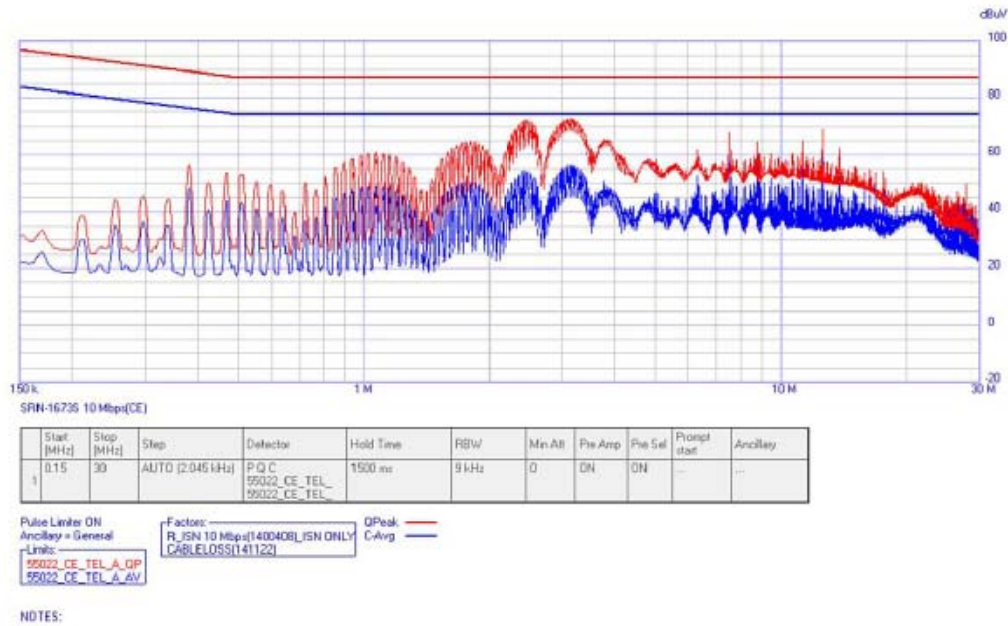
N

Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (LISN) [dB]	Factor (Cable Loss) [dB]
0.187	39.520	79.000	-39.480	30.790	66.000	-35.210	9.650	0.030
0.357	42.540	79.000	-36.460	26.970	66.000	-39.030	9.650	0.030
0.379	48.200	79.000	-30.800	39.090	66.000	-26.910	9.650	0.030
0.467	43.130	79.000	-35.870	33.730	66.000	-32.270	9.650	0.030
2.303	60.230	73.000	-12.770	42.130	60.000	-17.870	9.660	0.080
2.471	64.000	73.000	-9.000	45.190	60.000	-14.810	9.660	0.090
2.862	60.000	73.000	-13.000	42.170	60.000	-17.830	9.670	0.100
3.068	64.270	73.000	-8.730	47.230	60.000	-12.770	9.670	0.110

- Telecommunication

Temperature: 23.4 °C Humidity: 33.7 % R.H. Test Date: 03. 05 2015 Tested by: Tae Yeon, Kim

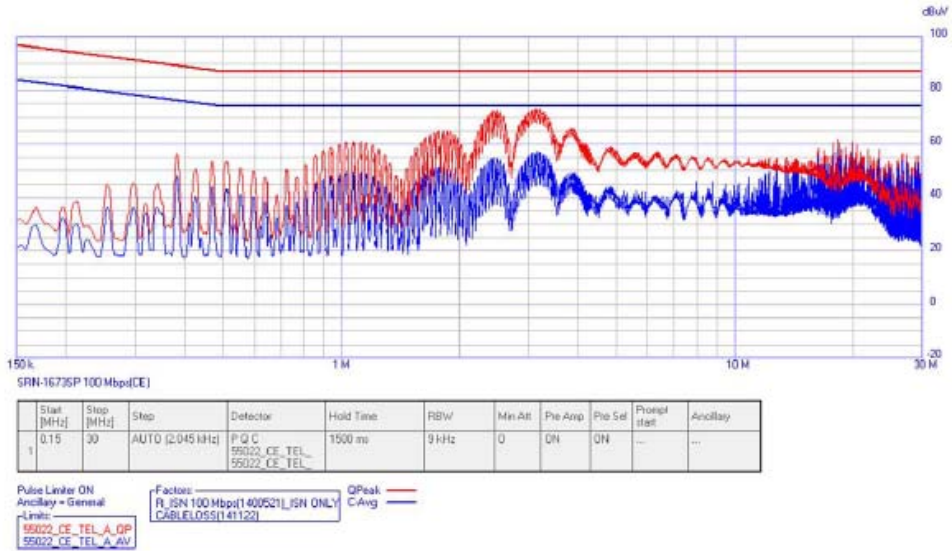
[10 Mbps]



10 Mbps

Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
0.297	45.440	91.320	-45.880	36.180	78.320	-42.140	10.130	0.030
0.381	56.420	89.260	-32.840	48.370	76.260	-27.890	10.060	0.030
0.424	50.220	88.370	-38.150	40.430	75.370	-34.940	10.040	0.030
0.467	53.500	87.570	-34.070	43.810	74.570	-30.760	10.050	0.030
2.305	69.050	87.000	-17.950	51.350	74.000	-22.650	9.850	0.080
2.391	71.720	87.000	-15.280	53.810	74.000	-20.190	9.850	0.090
2.432	72.330	87.000	-14.670	54.150	74.000	-19.850	9.850	0.090
3.115	72.730	87.000	-14.270	55.900	74.000	-18.100	9.840	0.110

[100 Mbps]



100 Mbps

Frequency [MHz]	Q-Peak [dBμV]	Limit [dBμV]	Margin [dB]	C-Avg [dBμV]	Limit [dBμV]	Margin [dB]	Factor (ISN) [dB]	Factor (Cable Loss) [dB]
0.297	45.550	91.320	-45.770	36.200	78.320	-42.120	9.660	0.030
0.383	56.330	89.210	-32.880	48.370	76.210	-27.840	9.620	0.030
0.426	50.450	88.330	-37.880	40.660	75.330	-34.670	9.600	0.030
0.469	53.600	87.530	-33.930	44.200	74.530	-30.330	9.590	0.030
2.355	70.850	87.000	-16.150	53.420	74.000	-20.580	9.380	0.080
2.442	72.590	87.000	-14.410	54.870	74.000	-19.130	9.380	0.090
2.878	68.890	87.000	-18.110	51.880	74.000	-22.120	9.360	0.110
3.132	73.100	87.000	-13.900	56.880	74.000	-17.120	9.360	0.110



[1 000 Mbps]

N/A

5.2 Radiated Emission Measurements

5.2.1 Test Description

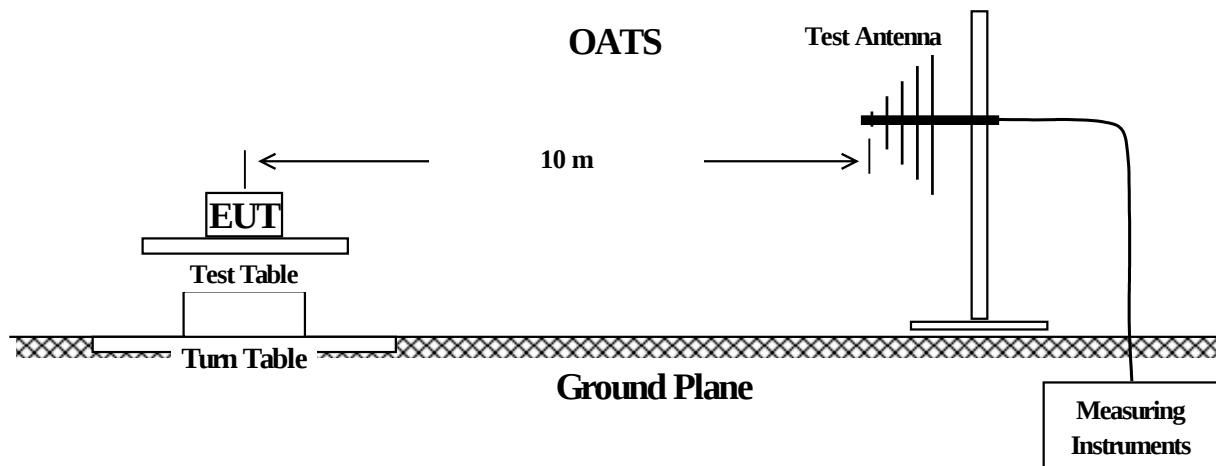
The radiated emissions measurements were performed on the ten-meter open-field test site and 3 m full chamber. The E.U.T was placed on a nonconductive turntable approximately 0.8 meters above the ground plane.

The frequency spectrum from 30 MHz to 1 000 MHz and 1 000 MHz to 6 000 MHz was scanned and maximum emission levels at each frequency recorded.

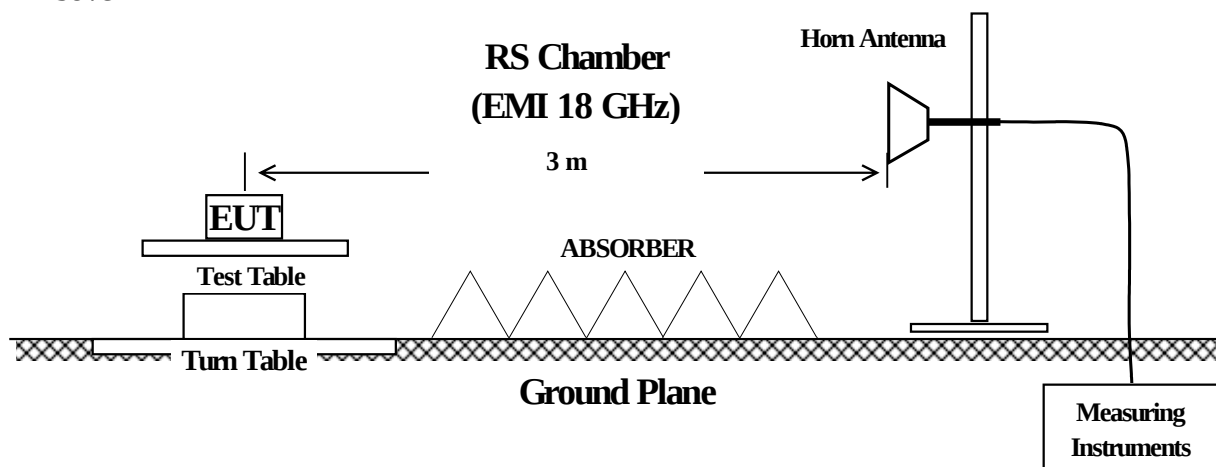
The system was rotated 360°, and the antenna was varied in the height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

- above 1 GHz : Antenna height is fixed to 1.0 m

* Below 1 GHz



* Above 1 GHz



5.2.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
EMI TEST Receiver	R & S	ESVS10	826008/014	04. 04. 2015
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-385	05. 09. 2015
OATS	KES	-	-	-
Antenna Mast	DAEIL EMC	-	-	-
Turn Table	DAEIL EMC	-	-	-
EMI TEST Receiver	R & S	ESR7	101190	08. 13. 2015
PREAMPLIFIER	8449B	H.P	3008A00538	07. 23. 2015
Double Ridged Horn Antenna	A-H-SYSTEM,INC	SAS-571	781	05. 13. 2015
RS Chamber (EMI 18GHz)	SEMITEC	-	-	-
Antenna Mast	AUDIX	-	-	-
Turn Table	AUDIX	-	-	-

5.2.3 Test Environments

Ambient Temperatures	Relative Humidity
see the data	see the data

5.2.4 Test Limits

Frequency (MHz)	EN 55022	
	Class B @ 10 m (dB μ V/m)	Class A @ 10 m (dB μ V/m)
30 to 230	30.0	40.0
230 to 1 000	37.0	47.0

Frequency (MHz)	EN 55022			
	Class B @ 3 m (dB μ V/m)		Class A @ 3 m (dB μ V/m)	
	PK	AV	PK	AV
1 000 to 3 000	70	50	76	56
3 000 to 6 000	74	54	80	60

5.2.5 Test Procedure

Before final measurements of radiated emission were made on the OATS, the E.U.T was scanned in semi-anechoic chamber in order to determine its emission spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the E.U.T's emission in amplitude, direction and frequency. This process was repeated during final radiated emission measurements on the OATS range, at each frequency, in order to ensure that maximum emissions amplitudes were attained.

The radiated emission test was performed with E.U.T exercise program loaded, and the emissions were scanned between 30 MHz to 6 000 MHz using the spectrum analyzer. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz(1 MHz), and the analyzer was operated in the CISPR quasi-peak(Peak) detection mode.

Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization, herein referred to as H and V, respectively.

5.2.6 Field Strength Calculation

F.S = Field Strength

M.R = Meter Reading

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

* Below 1 GHz : $F.S(dB\mu V/m) = M.R(dB\mu V) + [A.F(dB/m) + C.L(dB)]$

* Above 1 GHz : $F.S(dB\mu V/m) = M.R(dB\mu V) + [A.F(dB/m) + C.L(dB)] - A.G(35 dB)$

* Measurement in the presence of high ambient signals

In general, the ambient signals should not exceed the limit. Radiated emanations from the EUT at the point of measurement may, however, be impossible to measure at some frequencies due to ambient noise fields generated by local broadcast services, other manmade devices, and natural sources.

a) Perform measurements at close-in distances and determine the limit L2 corresponding to the close-in distance d2 by applying the following relation:

$$L2 = L1 (d1/d2)^2$$

where L1 is the specified limit in microvolts per metre ($\mu V/m$) at the distance d1.
Determine the possible environmental and compliance test conditions stipulated in Clause 8 using L2 as the new limit for distance d2.

b) In the frequency bands where the ambient noise values of Clause 8 are exceeded (measured values higher than 6 dB below the limit), the disturbance values of the EUT may be interpolated from the adjacent disturbance values. The interpolated value shall lie on the curve describing a continuous function of the disturbance values adjacent to the ambient noise.

5.2.7 Test Results

According to the data in section 5.2.8, the E.U.T complied with the EN 55022/CISPR22 standards.

5.2.8 Test Data

* Below 1 GHz

Temperature: 4.0℃ Humidity: 36.0 % R.H. Test Date: 03. 06. 2015 Tested by: Tae Yeon, Kim

Frequency (MHz)	Amplitude (dB μ V/m)	Antenna		Correction Factor		Corrected Amplitude (dB μ V/m)	Applicable Limit (dB μ V/m)	Margin (dB)
		Polar. (H/V)	Height (m)	Ant. (dB)	Cable (dB)			
60.820	18.700	V	1.000	13.010	1.810	33.520	40.000	6.480
185.630	17.400	H	4.000	11.190	3.280	31.870	40.000	8.130
222.750	21.400	V	1.000	10.730	3.640	35.770	40.000	4.230
249.980	27.300	H	4.000	11.750	3.870	42.920	47.000	4.080
250.010	27.200	V	1.000	11.750	3.870	42.820	47.000	4.180
259.900	19.500	H	4.000	12.080	3.970	35.550	47.000	11.450
334.140	20.200	H	4.000	14.140	4.640	38.980	47.000	8.020
482.620	20.100	H	1.720	17.370	5.780	43.250	47.000	3.750



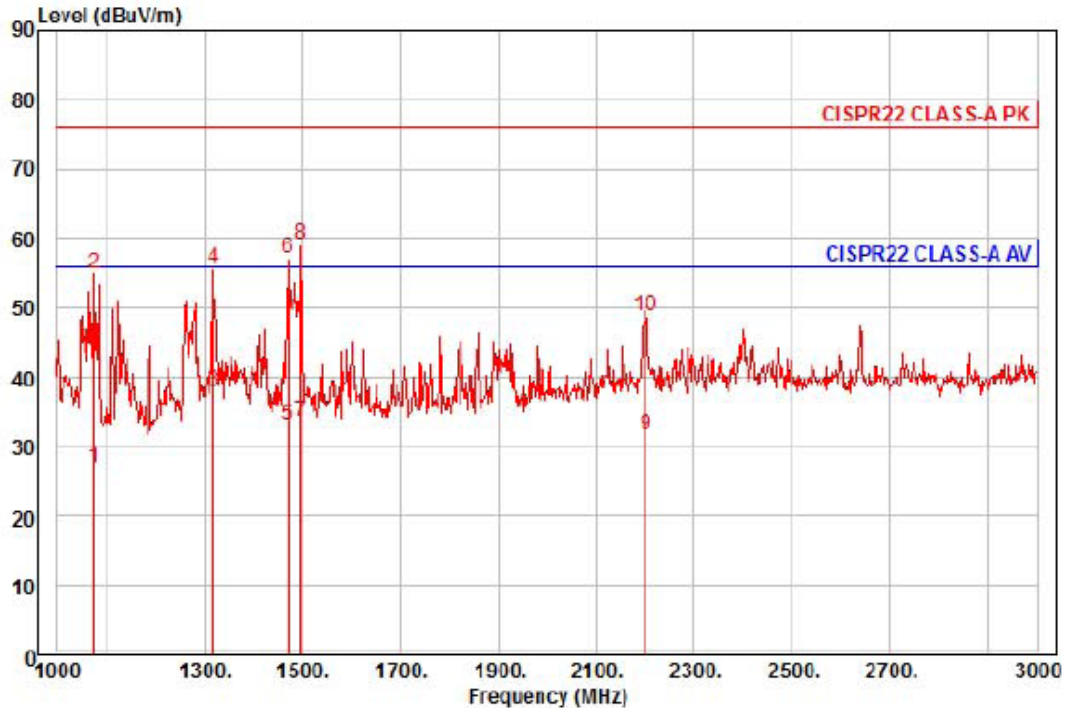
KES Co., Ltd.

C-3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 431-716, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
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Test report No.:
KES-E1-15T0067
Page (26) of (66)

* Above 1 GHz

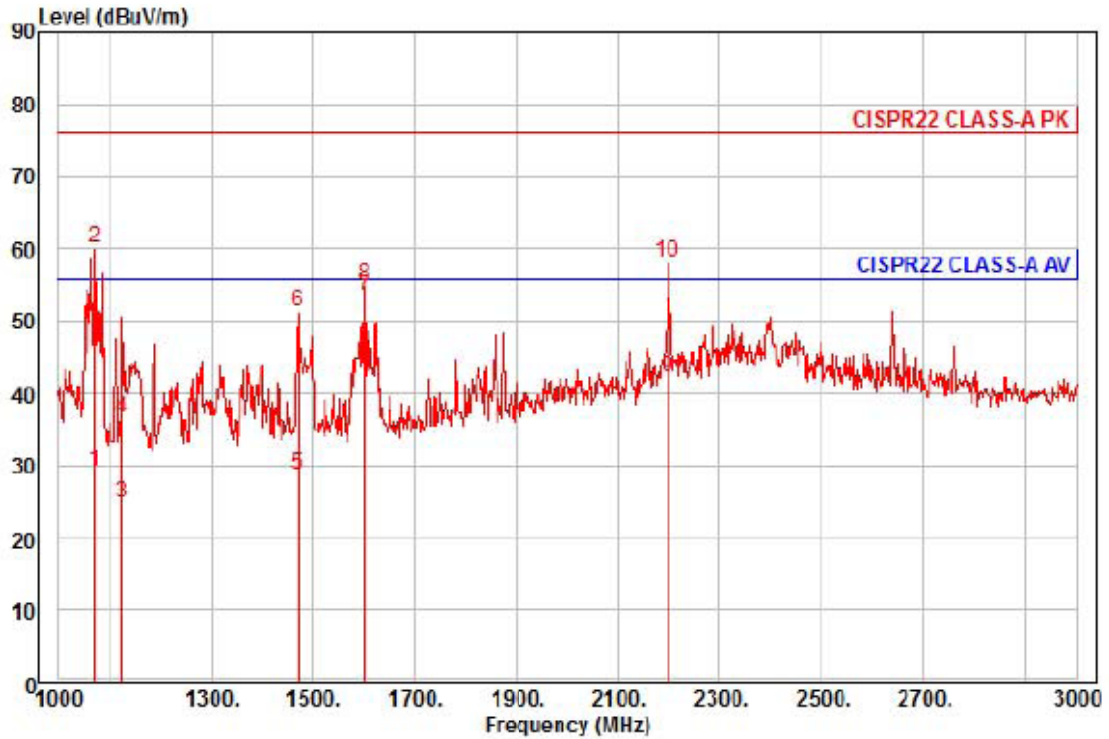
Temperature: 20.1 °C Humidity: 36.0 % R.H. Test Date: 03. 04. 2015 Tested by: Tae Yeon, Kim



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN ANT (2014.03.10) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NVR
EUT : SNR-1673SP
Mode : CE
Memo : (1 - 3) GHz

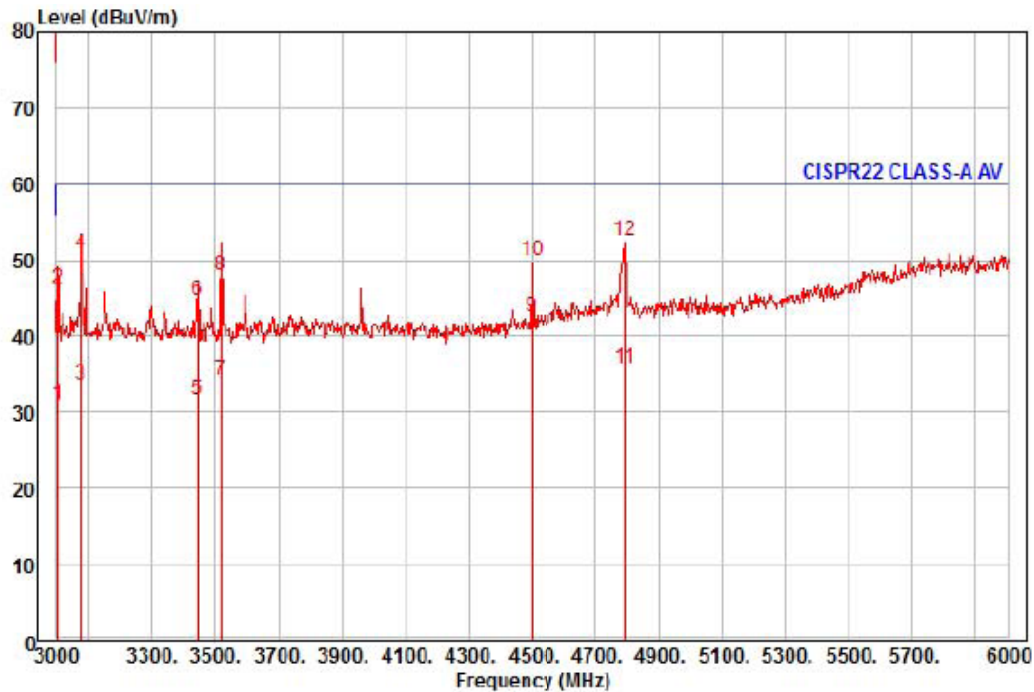
	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1076.00	34.03	23.30	5.62	36.07	2	56.00	-29.12	horizontal	Average
2	1076.00	62.20	23.30	5.62	36.07	2	76.00	-20.95	horizontal	Peak
3 av	1320.00	43.17	24.29	6.21	35.67	136	56.00	-18.00	horizontal	Average
4	1320.00	60.77	24.29	6.21	35.67	136	76.00	-20.40	horizontal	Peak
5	1470.00	37.11	24.90	6.58	35.42	33	56.00	-22.83	horizontal	Average
6	1470.00	61.18	24.90	6.58	35.42	33	76.00	-18.76	horizontal	Peak
7	1496.00	37.26	25.00	6.64	35.37	49	56.00	-22.47	horizontal	Average
8 pp	1496.00	62.87	25.00	6.64	35.37	49	76.00	-16.86	horizontal	Peak
9	2202.00	29.20	28.62	8.28	34.39	299	56.00	-24.29	horizontal	Average
10	2202.00	46.37	28.62	8.28	34.39	299	76.00	-27.12	horizontal	Peak

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The test results in the report only apply to the tested sample.



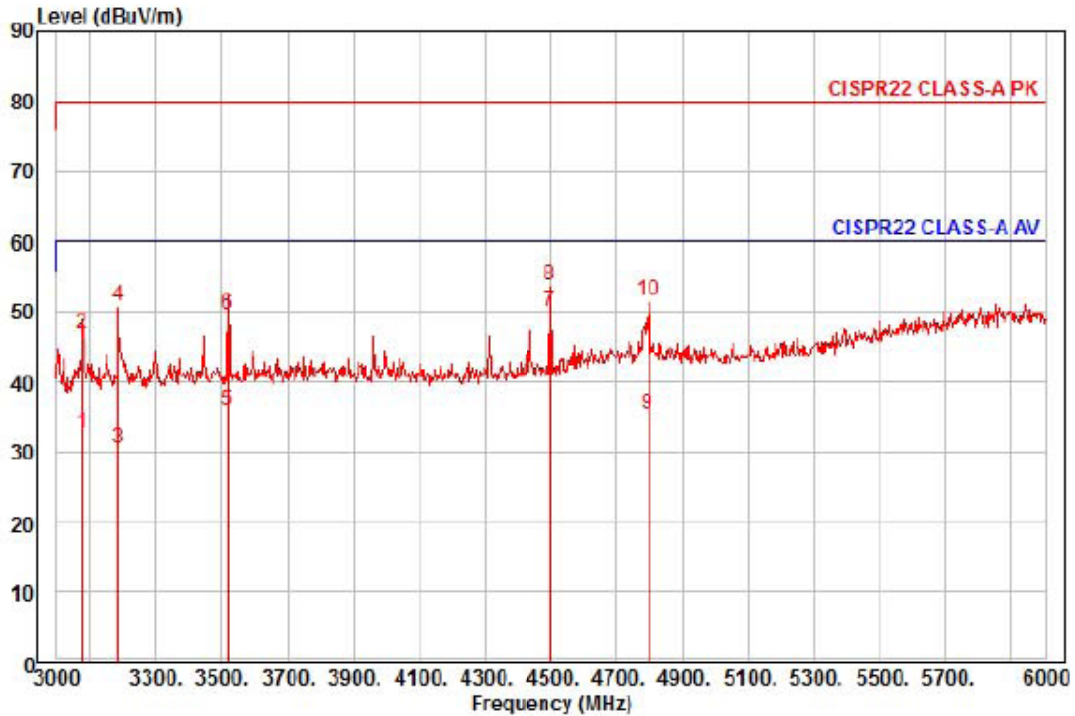
Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN ANT (2014.03.10) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NVR
EUT : SNR-1673SP
Mode : CE
Memo : (1 - 3) GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	1072.00	36.48	23.28	5.61	36.08	7	56.00	-26.71	vertical	Average
2 pk	1072.00	67.29	23.28	5.61	36.08	7	76.00	-15.90	vertical	Peak
3	1124.00	31.63	23.49	5.74	35.99	152	56.00	-31.13	vertical	Average
4	1124.00	43.33	23.49	5.74	35.99	152	76.00	-39.43	vertical	Peak
5	1470.00	32.51	24.90	6.58	35.42	18	56.00	-27.43	vertical	Average
6	1470.00	55.10	24.90	6.58	35.42	18	76.00	-24.84	vertical	Peak
7 pp	1600.00	56.05	25.65	6.89	35.20	163	56.00	-2.61	vertical	Average
8	1600.00	57.68	25.65	6.89	35.20	163	76.00	-20.98	vertical	Peak
9	2200.00	39.59	28.62	8.28	34.39	86	56.00	-13.90	vertical	Average
10	2200.00	55.49	28.62	8.28	34.39	86	76.00	-18.00	vertical	Peak



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN ANT (2014.03.10) horizontal
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NVR
EUT : SNR-1673SP
Mode : CE
Memo : (3 - 6) GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3003.00	24.60	30.25	9.96	33.84	149	60.00	-29.03	horizontal	Average
2	3003.00	39.79	30.25	9.96	33.84	149	80.00	-33.84	horizontal	Peak
3	3078.00	27.23	30.28	10.08	33.93	146	60.00	-26.34	horizontal	Average
4	3078.00	44.44	30.28	10.08	33.93	146	80.00	-29.13	horizontal	Peak
5	3444.00	24.80	30.41	10.65	34.34	121	60.00	-28.48	horizontal	Average
6	3444.00	38.00	30.41	10.65	34.34	121	80.00	-35.28	horizontal	Peak
7	3519.00	27.47	30.49	10.77	34.43	88	60.00	-25.70	horizontal	Average
8	3519.00	41.03	30.49	10.77	34.43	88	80.00	-32.14	horizontal	Peak
9 pp	4500.00	32.31	32.03	12.35	34.09	258	60.00	-17.40	horizontal	Average
10	4500.00	39.63	32.03	12.35	34.09	258	80.00	-30.08	horizontal	Peak
11	4794.00	23.54	33.04	12.83	33.57	238	60.00	-24.16	horizontal	Average
12 pk	4794.00	40.15	33.04	12.83	33.57	238	80.00	-27.55	horizontal	Peak



Site : chamber
Condition: CISPR22 CLASS-A PK 3m HORN ANT (2014.03.10) vertical
: RBW:1000.000kHz VBW:1000.000kHz SWT:Auto
Project : NVR
EUT : SNR-1673SP
Mode : CE
Memo : (3 - 6) GHz

	Freq	Read Level	Ant Factor	Cable Loss	Preamp Factor	TPos	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	deg	dBuV/m	dB		
1	3078.00	26.15	30.28	10.08	33.93	41	60.00	-27.42	vertical	Average
2	3078.00	40.43	30.28	10.08	33.93	41	80.00	-33.14	vertical	Peak
3	3186.00	23.90	30.32	10.25	34.05	270	60.00	-29.58	vertical	Average
4	3186.00	44.23	30.32	10.25	34.05	270	80.00	-29.25	vertical	Peak
5	3519.00	28.86	30.49	10.77	34.43	167	60.00	-24.31	vertical	Average
6	3519.00	42.82	30.49	10.77	34.43	167	80.00	-30.35	vertical	Peak
7 pp	4500.00	39.82	32.03	12.35	34.09	173	60.00	-9.89	vertical	Average
8 pk	4500.00	43.51	32.03	12.35	34.09	173	80.00	-26.20	vertical	Peak
9	4797.00	23.04	33.05	12.84	33.57	189	60.00	-24.64	vertical	Average
10	4797.00	39.29	33.05	12.84	33.57	189	80.00	-28.39	vertical	Peak

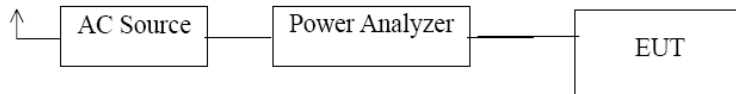
5.3 Harmonics / Voltage Fluctuations Measurements

5.3.1 Test Description

Harmonics of the fundamental current were measured up to 2 kHz using a universal power analyzer. The measurements were carried out under steady conditions and using averaging.

Before making measurements the class of the E.U.T has been evaluated, it is necessary for the E.U.T to decide which class the E.U.T fulfills into; A, B, C or D

AC Mains



5.3.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
AC Source	EM test	ACS 500 N	V1024106760	08. 13. 2015
Digital Power Analyzer	EM test	DPA 500 N	V1024106759	08. 13. 2015

5.3.3 Test Environments

Ambient Temperatures : see the data

Relative Humidity : see the data

5.3.4 Test Procedures

The E.U.T was installed and placed on a non-conductive table and was connected to the AC power source, 230 V (ac), 50 Hz via the measuring equipment with its attached AC power cord. All other equipment or peripherals included in the test, and having a separate power supply, are connected to the outlet, supplying 230 V (ac), 50 Hz. A typical configuration is defined in the specification ANSI 63.4 or CISPR22. This ensures the repeatability of the test.

The E.U.T is set in operation and was monitored for measurements with the software, supplied by test equipment manufacturer. An EMC test program provided by client was used to exercise the E.U.T.



5.3.5 Test Results

According to the data in section 5.3.6 and 5.3.7, the EUT complied with the EN 61000-3-2:2006+A1:2009+A2:2009 and EN 61000-3-3:2008 standard, and detailed test results are found in the following test data.

5.3.6 Test Data - Harmonic

Temperature: 18.3 °C Humidity: 34.0 % R.H. Test Date: 03. 03. 2015 Tested by: Tae Yeon, Kim

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	161.216E-3			
2	722.246E-6	0.067	1.08	PASS
3	48.703E-3	2.118	2.30	PASS
4	611.950E-6	0.142	430.00E-3	PASS
5	10.446E-3	0.916	1.14	PASS
6	616.089E-6	0.205	300.00E-3	PASS
7	9.298E-3	1.208	770.00E-3	PASS
8	551.993E-6	0.240	230.00E-3	PASS
9	8.029E-3	2.007	400.00E-3	PASS
10	619.694E-6	0.337	184.00E-3	PASS
11	4.423E-3	1.340	330.00E-3	PASS
12	560.235E-6	0.365	153.33E-3	PASS
13	6.010E-3	2.862	210.00E-3	PASS
14	556.405E-6	0.423	131.43E-3	PASS
15	5.657E-3	3.772	150.00E-3	PASS
16	633.785E-6	0.551	115.00E-3	PASS
17	4.008E-3	3.028	132.35E-3	PASS
18	666.787E-6	0.652	102.22E-3	PASS
19	4.758E-3	4.018	118.42E-3	PASS
20	645.187E-6	0.701	92.00E-3	PASS
21	4.673E-3	2.908	160.71E-3	PASS
22	690.920E-6	0.826	83.64E-3	PASS
23	4.658E-3	3.174	146.74E-3	PASS
24	614.379E-6	0.801	76.66E-3	PASS
25	2.074E-3	1.537	135.00E-3	PASS
26	604.050E-6	0.854	70.77E-3	PASS
27	2.964E-3	2.371	124.99E-3	PASS
28	633.335E-6	0.964	65.71E-3	PASS
29	1.895E-3	1.628	116.39E-3	PASS
30	573.004E-6	0.934	61.33E-3	PASS
31	2.254E-3	2.071	108.87E-3	PASS
32	558.172E-6	0.971	57.50E-3	PASS
33	1.836E-3	1.795	102.27E-3	PASS
34	592.848E-6	1.095	54.12E-3	PASS
35	1.634E-3	1.694	96.44E-3	PASS
36	534.506E-6	1.046	51.11E-3	PASS
37	2.103E-3	2.306	91.21E-3	PASS
38	592.524E-6	1.224	48.42E-3	PASS
39	1.345E-3	1.554	86.53E-3	PASS
40	595.919E-6	1.295	46.00E-3	PASS



Test Data - Harmonics (continued)

Maximum harmonic voltage results

Hn	Ieff [A]	Ueff [%]	Limit [%]	Result
1	231.44	100.624		
2	51.24E-3	0.022	0.2	PASS
3	60.58E-3	0.026	0.9	PASS
4	45.38E-3	0.020	0.2	PASS
5	39.20E-3	0.017	0.4	PASS
6	31.93E-3	0.014	0.2	PASS
7	63.74E-3	0.028	0.3	PASS
8	19.91E-3	0.009	0.2	PASS
9	85.26E-3	0.037	0.2	PASS
10	7.80E-3	0.003	0.2	PASS
11	52.86E-3	0.023	0.1	PASS
12	14.14E-3	0.006	0.1	PASS
13	54.08E-3	0.024	0.1	PASS
14	26.69E-3	0.012	0.1	PASS
15	71.29E-3	0.031	0.1	PASS
16	33.76E-3	0.015	0.1	PASS
17	18.18E-3	0.008	0.1	PASS
18	16.36E-3	0.007	0.1	PASS
19	76.83E-3	0.033	0.1	PASS
20	23.75E-3	0.010	0.1	PASS
21	76.90E-3	0.033	0.1	PASS
22	19.43E-3	0.008	0.1	PASS
23	17.91E-3	0.008	0.1	PASS
24	10.79E-3	0.005	0.1	PASS
25	53.81E-3	0.023	0.1	PASS
26	19.42E-3	0.008	0.1	PASS
27	58.97E-3	0.026	0.1	PASS
28	14.61E-3	0.006	0.1	PASS
29	19.23E-3	0.008	0.1	PASS
30	8.41E-3	0.004	0.1	PASS
31	41.89E-3	0.018	0.1	PASS
32	19.04E-3	0.008	0.1	PASS
33	43.76E-3	0.019	0.1	PASS
34	15.79E-3	0.007	0.1	PASS
35	26.23E-3	0.011	0.1	PASS
36	7.66E-3	0.003	0.1	PASS
37	38.76E-3	0.017	0.1	PASS
38	13.44E-3	0.006	0.1	PASS
39	35.28E-3	0.015	0.1	PASS
40	13.41E-3	0.006	0.1	PASS

5.3.7 Test Data - Voltage Fluctuations

Maximum Flicker results

	E.U.T values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.134	4.00	PASS
dt [s]	0.000	0.50	PASS

5.4 Electrostatic Discharge Immunity

5.4.1 Test Description

The E.U.T and all local support equipment were placed on non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.

5.4.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
ESD SIMULATOR	Noise Ken	ESS-2000	ESS05X4620	06.30.2015

5.4.3 Test Environment

Ambient Temperatures :	15 °C ~ 35 °C
Relative Humidity :	25 % R.H. ~ 75 % R.H.
Atmospheric Pressure :	86.0 kPa ~ 106.0 kPa

5.4.4 Test Levels

Discharge Impedance :	330 Ω ± 10 % / 150 pF ± 10 %
Type of Discharge :	Direct - Air Discharge(± 2 / ± 4 / ± 8 kV), Contact Discharge(± 2 / ± 4 / ± 6 kV) Indirect - HCP Discharge(± 4 / ± 6 kV), VCP Discharge(± 4 / ± 6 kV)
Polarity of Output Voltage :	Positive and Negative
Discharge Repetition Rate :	1/sec
Number of Discharges :	more than 10 times
Performance Criteria :	B

5.4.5 Test Procedure

Test programs and software were chosen so as to exercise all normal modes of operation of the E.U.T. The use of special exercising software is encouraged, but permitted only where it can be shown that the E.U.T is being comprehensively exercised.

The test was conducted in the following order: Air Discharge, Direct Contact Discharge, Indirect Contact Horizontal Coupling Plane (HCP) Discharge, and Indirect Contact Vertical Coupling Plane (VCP) Discharge. The electrostatic discharge test levels were set and discharges for the different test modes were set appropriately. The electrostatic discharge is applied to the conductive surface of the E.U.T, and along all seams and control surfaces on the E.U.T. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded.

5.4.6 Test Results

According to the data in section 5.4.7, the E.U.T complied with the EN61000-4-2 standards, and detailed test results are found in the following test data.

5.4.7 Test Data

Temperature: 23.4 °C Humidity: 33.7 % R.H. Test Date: 03. 05. 2015 Tested by: Tae Yeon, Kim

Indirect Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Test level	Results	
1	HCP Contact	Contact Discharge	$\pm (2,4,6) \text{ kV}$	complied	-
2	VCP Contact	Contact Discharge	$\pm (2,4,6) \text{ kV}$	complied	-

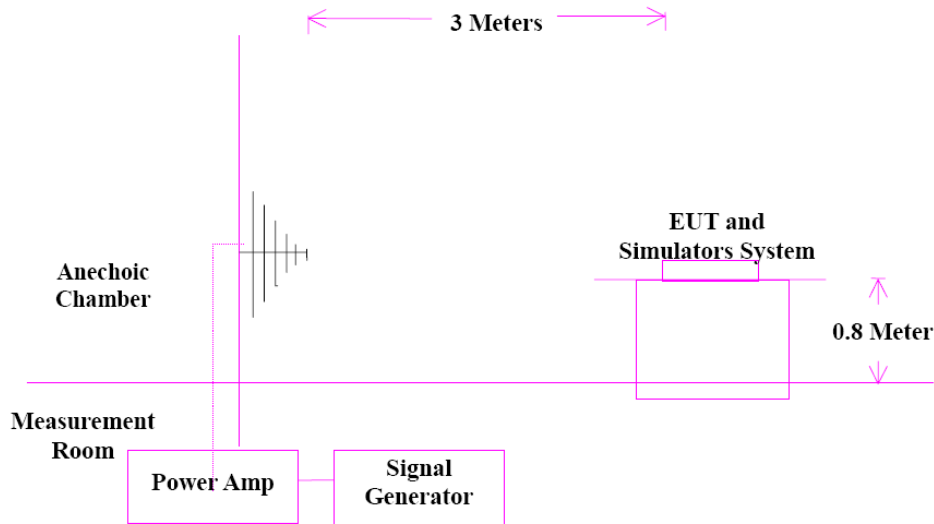
Direct Discharge

No.	Test Point	Discharge Method	Performance		Remarks
			Test level	Results	
1	Enclosure	Contact Discharge	$\pm (6) \text{ kV}$	A	-
2	Screw bolt	Contact Discharge	$\pm (6) \text{ kV}$	A	-
3	Port side	Contact Discharge	$\pm (6) \text{ kV}$	A	

5.5 Radio-frequency electromagnetic field Amplitude modulated Immunity

5.5.1 Test Description

The E.U.T and all local support equipment were placed on a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.



5.5.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Average Power Sensor	Agilent	E9301A	MY41498011	08.13.2015
Average Power Sensor	Agilent	E9301A	-	08.13.2015
Signal Generator	HP	ESG-3000A	US37040210	08.13.2015
Power Meter	Agilent	E4419B	MY45101506	08.13.2015
Power Amplifier	Infinitech	ITA0300-200	-	08.13.2015
Power Amplifier	Infinitech	ITA0750-200	-	08.13.2015
Power Amplifier	Infinitech	ITA1500-100	-	08.13.2015
Power Amplifier	Infinitech	ITA2500-100	-	08.13.2015
Stacked Log.-Per.Antenna	Schwarzbeck	STLP 9128 D	9128D038	-
RS Chamber(EMI 18GHz)	SEMITEC	-	-	-

5.5.3 Test Environments

Ambient Temperatures :	15 °C ~ 35 °C
Relative Humidity :	25 % R.H. ~ 75 % R.H.
Atmospheric Pressure :	86.0 kPa ~ 106.0 kPa

5.5.4 Test Levels

Frequency Range :	80 MHz to 2 700 MHz
Field Strength :	10 V/m(3 V/m, 1 V/m)
Modulation :	80 % Amplitude Modulation (1 kHz) Pulse Modulation (1 Hz (0.5 s ON: 0.5 s OFF))
Distance of ANT-E.U.T :	3 meters
Antenna Polarity :	Horizontal and Vertical
Frequency Step :	1 %
Performance Criteria :	A

5.5.5 Test Procedures

The E.U.T is set into operation and was monitored for variations in performance. The test signal start frequency (80 MHz) and stop frequency (2 700 MHz) were set, including the field strength at 10 V/m(3 V/m, 1 V/m), 80 % modulated through immunity test software. The software maintains the necessary field strength through the frequency range, with the transmitting antenna horizontally polarized. If an error is detected, the field is reduced until the error is not repeatable, the field is then manually increased until the error begins to occur. This threshold level, the frequency and the error created are noted before continuing. The test is then repeated with vertical polarization, using the same test configuration for all four sides.

5.5.6 Test Results

According to the data in section 5.5.7, the E.U.T complied with the EN61000-4-3 standards, and detailed test results are found in the following test data.

**KES Co., Ltd.**

C-3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 431-716, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Test report No.:
KES-E1-15T0067
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5.5.7 Test Data

Temperature: 20.1 °C Humidity: 36.0 % R.H. Test Date: 03. 04. 2015 Tested by: Tae Yeon, Kim

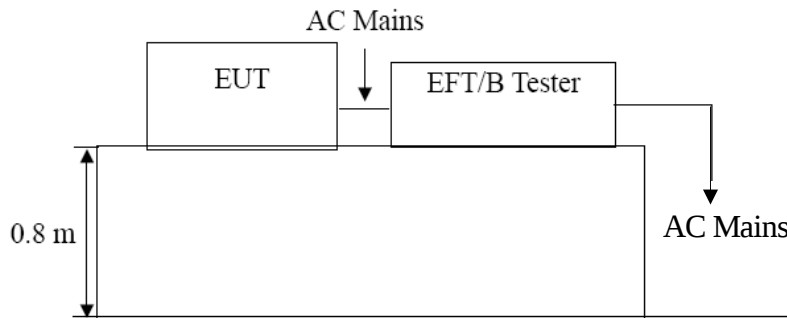
No.	Test Point	Performance Results		Remarks
		Horizontal	Vertical	
1	Front	complied	complied	-
2	Rear	complied	complied	-
3	Right Side	complied	complied	-
4	Left Side	complied	complied	-

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5.6 Fast Transient Immunity

5.6.1 Test Description

The E.U.T and all local support equipment were placed a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode. If the E.U.T has a non-detachable supply cable more than 1 m long, the excess length of this cable was gathered into a flat coil with a 0.4 m diameter and situated at a distance of 0.1 m above the RGP.



5.6.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Ultra Compact Simulator	EM TEST	UCS 500 N5	V0936105120	08. 13. 2015
Capacitive Coupling Clamp	EM TEST	HFK	070925	08. 14. 2015
MotorVariac	EM TEST	MV2616	V0936105123	08. 13. 2015

5.6.3 Test Environments

Ambient Temperatures :	15 °C ~ 35 °C
Relative Humidity :	25 % R.H. ~ 75 % R.H.
Atmospheric Pressure :	86.0 kPa ~ 106.0 kPa

5.6.4 Test Levels

Open Circuit Output Test Voltage :	☒ Power Supply AC; ± 2 kV ☐ Power Supply DC; ± 1 kV ☒ I/O Signal, Data and Control ports; ± 1 kV
Repetition Frequency of the Impulses :	100 kHz
Polarity :	Positive and Negative
Rise Time of One Pulse :	5 ns ± 30 %
Impulse Duration :	50 ns ± 30 %
Burst Duration :	15 ms ± 20 %
Burst Period :	300 ms ± 20 %
Performance Criteria :	B

5.6.5 Test Procedure

The E.U.T was connected to the test equipment, and monitored for performance. The test level was set and the test signal was applied for 200 seconds. A test signal of ± 1 kV, and ± 2 kV was Coupled to Line and Ground, Neutral and Ground, Line plus Neutral and Ground, and Protective Earth and Ground. When an error occurs, the test level is reduced until the error recovers and then increased until the threshold level is reached. This threshold and the error conditions were noted. This procedure was then repeated for the other coupling modes.

5.6.6 Test Results

According to the data in section 5.6.7, the E.U.T complied with the EN61000-4-4 standards, and detailed test results are found in the following test data.

5.6.7 Test Data

Temperature: 23.4 °C Humidity: 33.7 % R.H. Test Date: 03. 05 .2015 Tested by: Tae Yeon, Kim

On AC Power Supply

No.	Test Point	Test Level	Performance Results		Remarks
			+Burst	-Burst	
1	L1	± 2 kV	complied	complied	-
2	L2	± 2 kV	complied	complied	-
3	PE	± 2 kV	complied	complied	-
4	L1-L2	± 2kV	complied	complied	-
5	L1-PE	± 2kV	complied	complied	-
6	L2-PE	± 2kV	complied	complied	-
7	L1-L2-PE	± 2kV	complied	complied	-

On DC Power Supply

No.	Test Point	Test Level	Performance Results		Remarks
			+Burst	-Burst	
1	-	± 1 kV	-	-	-
2	-	± 1 kV	-	-	-
3	-	± 1 kV	-	-	-

On I/O Signal, Data and Control ports

No.	Test Point	Test Level	Performance Results		Remarks
			+Burst	-Burst	
1	Alarm	± 1 kV	complied	complied	-
2	RJ-45	± 1 kV	complied	complied	-

5.7 Surge Immunity

5.7.1 Test Description

The E.U.T and all local support equipment was placed on a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.

5.7.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Ultra Compact Simulator	EM TEST	UCS 500 N5	V0936105120	08. 14. 2015
MotorVariac	EM TEST	MV2616	V0936105123	08. 13. 2015
CDN	EM TEST	CNV 504N	V0936105121	-

5.7.3 Test Environments

Ambient Temperatures :	15 °C ~ 35 °C
Relative Humidity :	25 % R.H. ~ 75 % R.H.
Atmospheric Pressure :	86.0 kPa ~ 106.0 kPa

5.7.4 Test Levels

Open Circuit Test Voltage :	☒ AC Power; ± 1 kV line-to-line, ☒ AC Power; ± 2 kV line-to-ground ☐ DC Power; $\pm 0,5$ kV line-to-ground ☒ Data and Control Line; ± 1 kV line-to-ground
Open Circuit Voltage Waveform :	1.2/50 microsecond
Short Circuit Current Waveform :	8/20 microsecond
Number of Tests :	5 positive and 5 negative
Repetition Rate :	1/min
Performance Criteria :	B

5.7.5 Test Procedure

The surges have to be applied line to line and line(s) and ground. In case of testing line to ground the test voltage has to be applied successively between each of the lines and ground, if there is no other specification. All lower levels including the selected test level must be satisfied. For testing the secondary protection the output voltage of the generator must be increased up to the worst case voltage break down level of the primary protection.

5.7.6 Test Results

According to the data in section 5.7.7, the E.U.T complied with the EN61000-4-5 standards, and detailed test results are found in the following test data.

5.7.7 Test Data

Temperature: 23.4 °C Humidity: 33.7 % R.H. Test Date: 03. 05.2015 Tested by: Tae Yeon, Kim

On AC Power Supply

No.	Test Point	Test Level	Performance Results		Remarks
			+Surge	-Surge	
1	L1-L2	$\pm (1, 2) \text{ kV}$	complied	complied	-
2	L1-PE	$\pm (1, 2) \text{ kV}$	complied	complied	-
3	L2-PE	$\pm (1, 2) \text{ kV}$	complied	complied	-

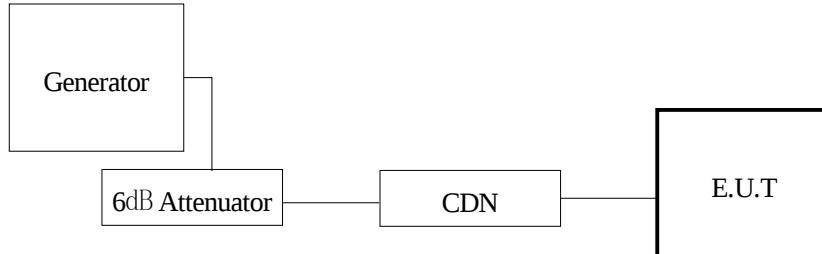
On I/O Signal, Data and Control ports

No.	Test Point	Test Level	Performance Results		Remarks
			+Surge	-Surge	
1	Alarm	$\pm (0,5, 1) \text{ kV}$	complied	complied	-

5.8 Radio-frequency continuous conducted Immunity

5.8.1 Test Descriptions

The E.U.T and all local support equipment were placed on a non-metallic support 0.1 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.



5.8.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Continuous Wave Simulator	EM TEST	CWS 500N1	V0936105119	08. 14. 2015
6dB Attenuator	EM TEST	ATT6	1208-34	08. 13. 2015
CDN	EM TEST	CDN-M2/M3N	0909-06	08. 13. 2015
EM Injection Clamp	EM TEST	EM 101	35943	02. 11. 2016

5.8.3 Test Environments

Ambient Temperatures :	15 °C ~ 35 °C
Relative Humidity :	25 % R.H. ~ 75 % R.H.
Atmospheric Pressure :	86.0 kPa ~ 106.0 kPa

5.8.4 Test Levels

Frequency Range :	150 kHz to 100 MHz
Voltage Level :	10 V(3 V, 1 V)
Modulation :	80 % Amplitude Modulation (1 kHz) Pulse Modulation (1 Hz (0.5 s ON: 0.5 s OFF))
Frequency Step :	1 %
Performance Criteria :	A

5.8.5 Test Procedure

The test was performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 Ω load resistor. The frequency range is swept from 150 kHz to 100 MHz, using the signal levels established during the setting process, and with the disturbance signal 80 % amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF-signal level or to switch coupling device as necessary.

5.8.6 Test Results

According to the data in section 5.8.7, the E.U.T complied with the EN61000-4-6 standards, and detailed test results are found in the following test data.

5.8.7 Test Data

Temperature: 23.4 °C Humidity: 33.7 % R.H. Test Date: 03. 05. 2015 Tested by: Tae Yeon, Kim

On AC Power Supply

No.	Test Point	Performance		Remarks
		Coupling method	Results	
1	M3N	CDN	complied	-

On DC Power Supply

No.	Test Point	Performance		Remarks
		Coupling method	Results	
1	-	CDN	-	-

On I/O Signal, Data and Control ports

No.	Test Point	Performance		Remarks
		Coupling method	Results	
1	Alarm	EM Clamp	complied	-
2	RJ-45	EM Clamp	complied	-

5.9 Voltage Dips and Voltage Interruptions Immunity Measurements

5.9.1 Test Descriptions

The E.U.T and all local support equipment was placed on a non-metallic support 0.8 m above a reference ground plane (RGP) and was put into operation according to the specified operating mode.

5.9.2 Test Equipments

Description	Manufacturer	Model Number	Serial Number	Cal. Due
Ultra Compact Simulator	EM TEST	UCS 500 N5	V0936105120	08.13.2015
MotorVariac	EM TEST	MV2616	V0936105123	08.13.2015

5.9.3 Test Environments

Ambient Temperatures :	15 °C ~ 35 °C
Relative Humidity :	25 % R.H. ~ 75 % R.H.
Atmospheric Pressure :	86.0 kPa ~ 106.0 kPa

5.9.4 Test Levels

Overshoot/Undershoot of Actual Voltage :	Less than ± 5 % of the change in voltage
Voltage Rise and Fall Time :	Between 1 and 5 microseconds
Test Voltage / Test Frequency :	230 V (ac) / 50 Hz
Frequency Deviation of Test Voltage :	Less than ± 2 % of rated frequency
Number of Tests :	3 times
Test Intervals :	10 sec
Performance Criteria :	B for Voltage Dips C for Voltage Short Interruptions A for Voltage Variation

5.9.5 Test Procedure

For each test any degradation of performance were recorded. The monitoring equipment should be capable of displaying the status of the operational mode of the E.U.T during and after the tests. After each group of tests a full functional check were performed.

5.9.6 Test Results

According to the data in section 5.10.7, the E.U.T complied with the EN 61000-4-11 standards.

5.9.7 Test Data

Temperature: 18.3 °C Humidity: 34.0 % R.H. Test Date: 03. 03. 2015 Tested by: Tae Yeon, Kim

Voltage Dips(AC Power Supply)

No.	Depth	Duration	Results	Remarks
1	20 %	250T	complied	-
2	30 %	25T	complied	-
3	60 %	10T	complied	-
4	100 %	250T	complied	-

Voltage variations(AC Power Supply)

No.	Test Level		Results	Remarks
1	Unom + 10 %	253 V (ac)	complied	-
2	Unom - 15 %	195.5 V (ac)	complied	-

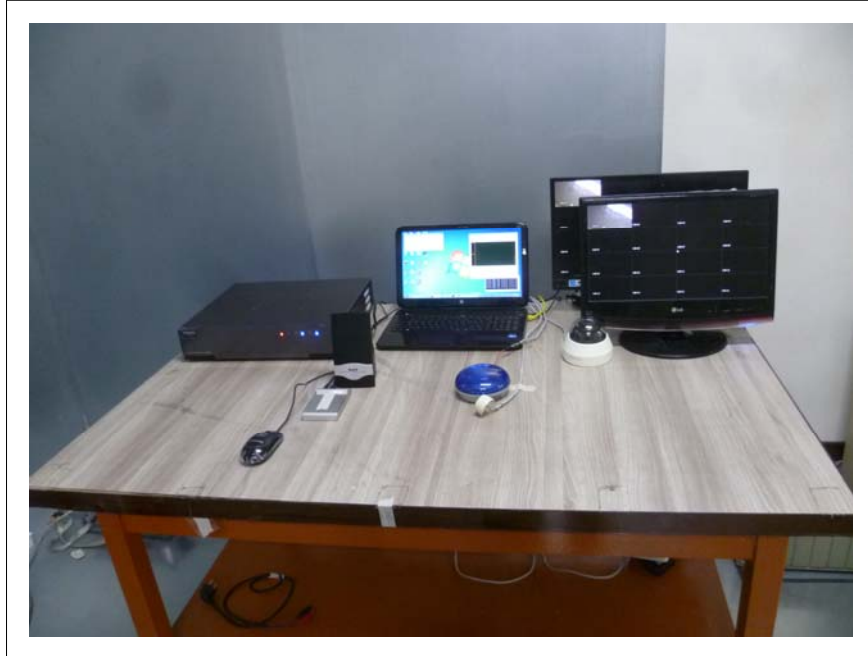
6. Test Setup Photographs

6.1 Conducted Emission

- AC Main

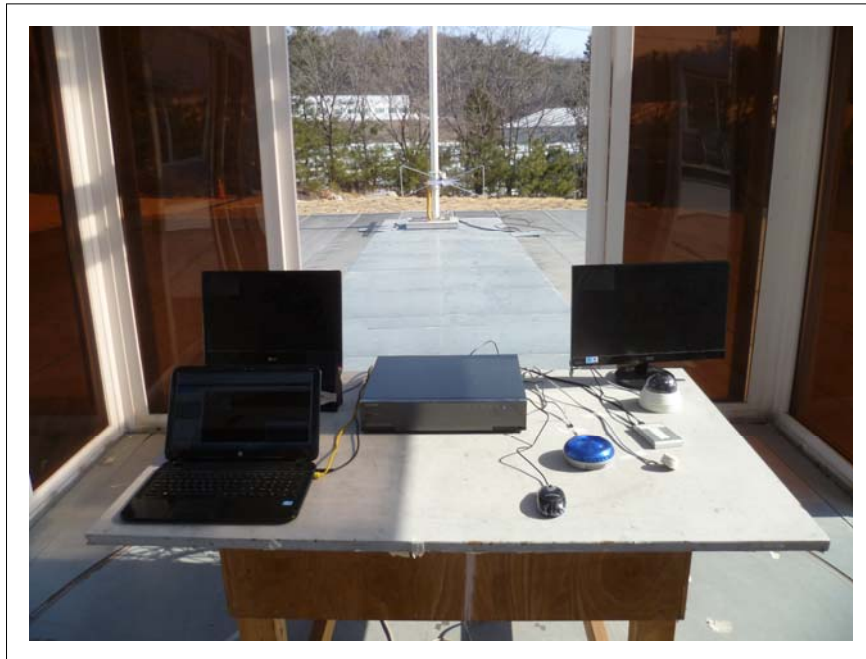


- **Telecommunication Emission**



6.2 Radiated Emission

* Below 1 GHz



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*** Above 1 GHz**



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6.3 Harmonics / Voltage Fluctuations

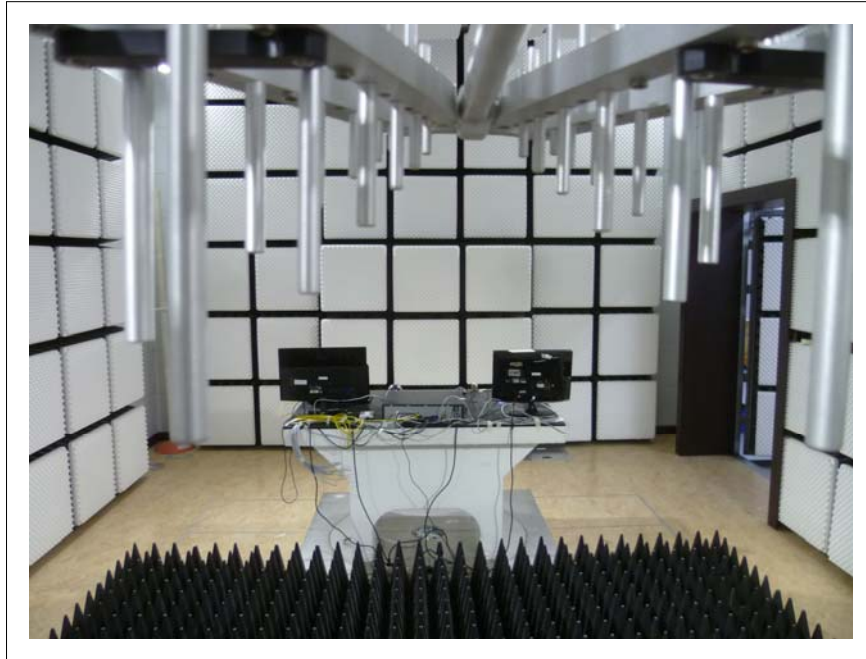


6.4 Electrostatic Discharge Immunity





6.5 Radio frequency electromagnetic field immunity



6.6 Fast Transient Immunity



6.7 Surge Immunity



6.8 Radio-frequency continuous conducted Immunity



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6.9 Voltage Dips and Voltage Interruptions Immunity



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7. External Photographs



[FRONT VIEW]



[REAR VIEW]

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NETWORK CAMERA

Model No : SRN-1673SP

Manufacturer : TIANJIN SAMSUNG TECHWIN OPTO-ELECTRONIC CO.,LTD

Made in KOREA



[LABEL VIEW]

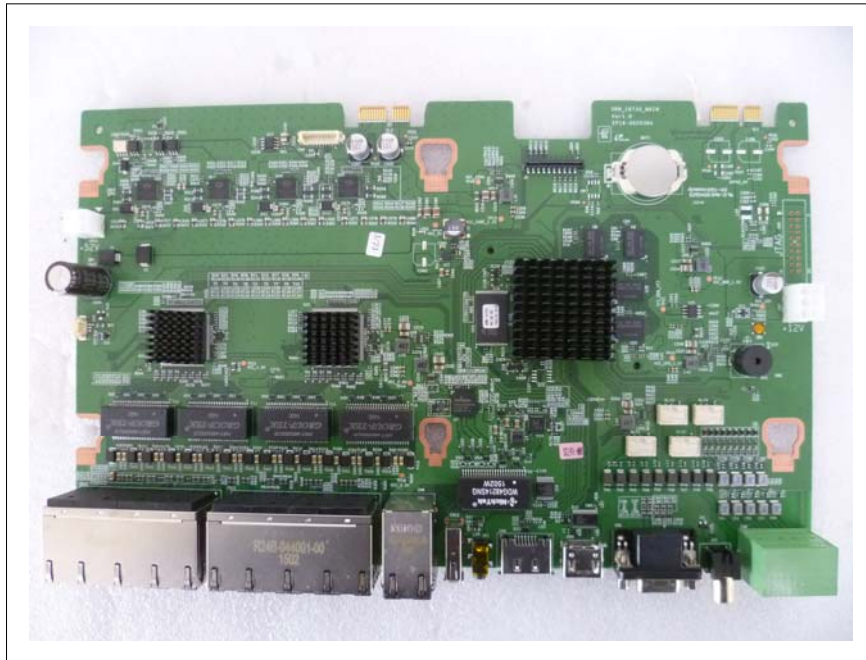
8. Internal Photographs



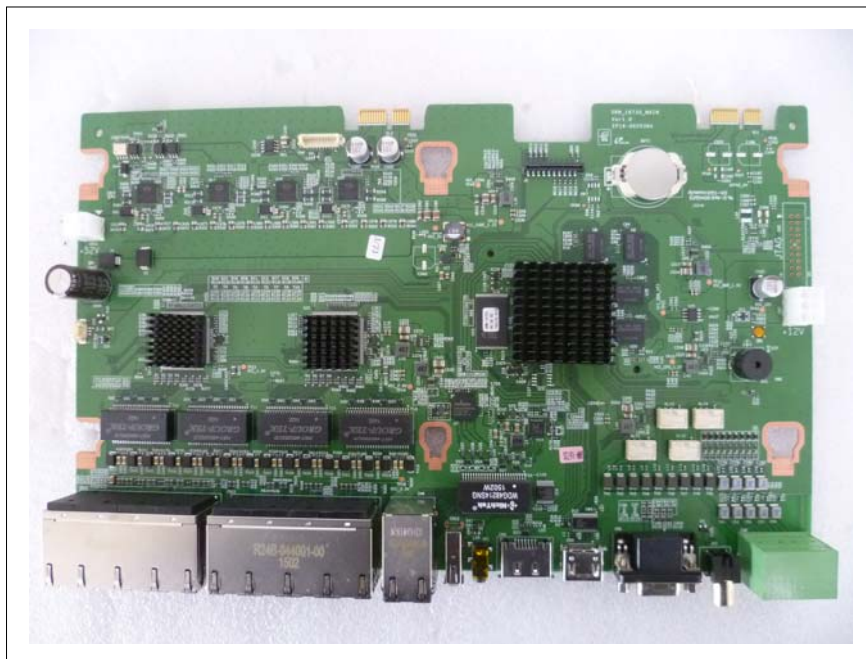
[INTERNAL VIEW]

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○ Main Board



[TOP VIEW]



[BOTTOM VIEW]

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○ USB Board



[TOP VIEW]



[BOTTOM VIEW]

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○ LED Board

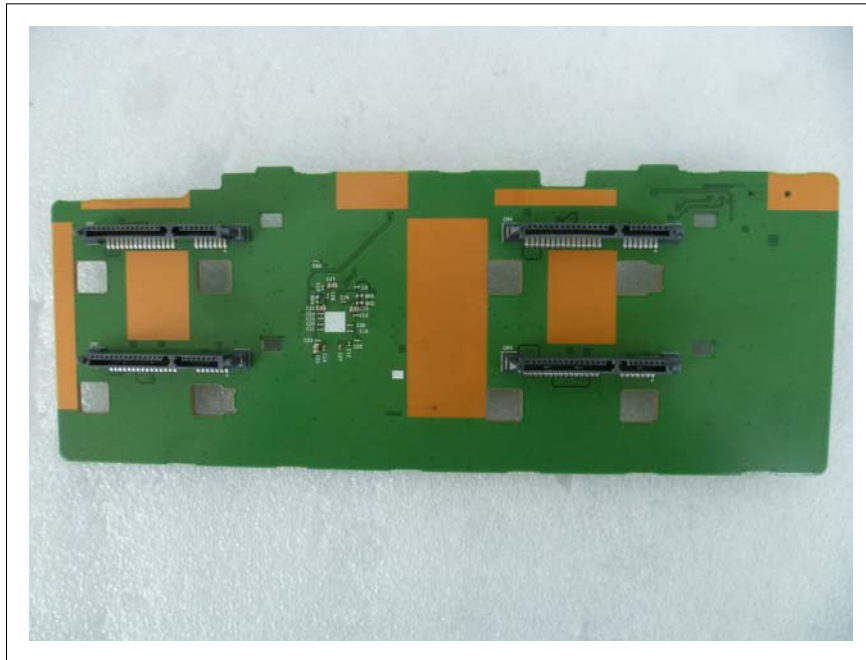


[TOP VIEW]

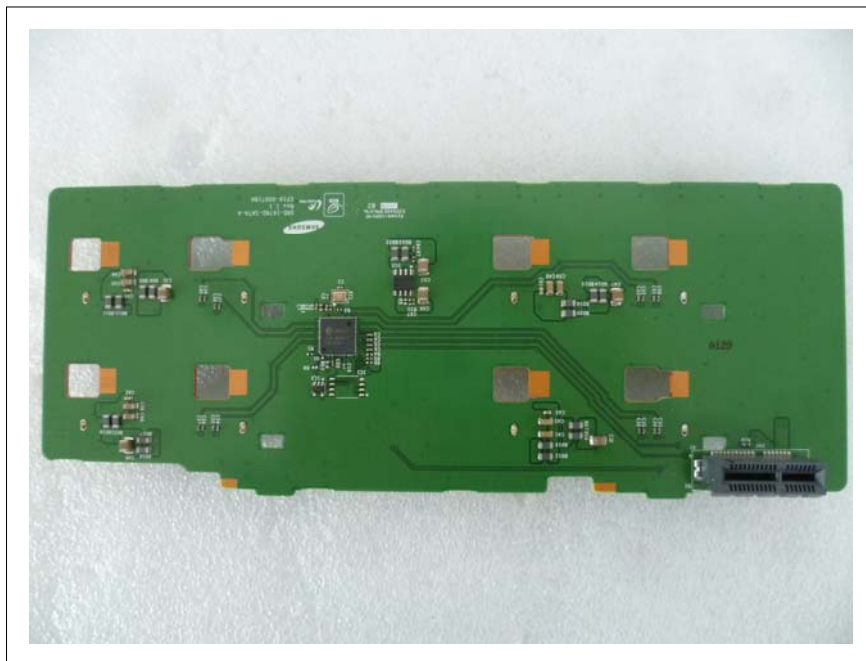


[BOTTOM VIEW]

○ HDD Slot Board



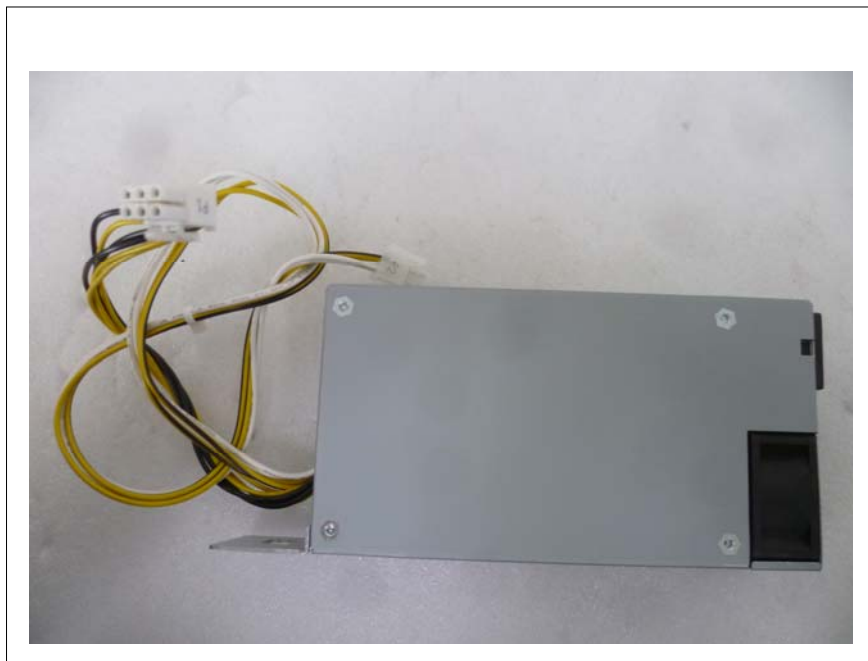
[TOP VIEW]



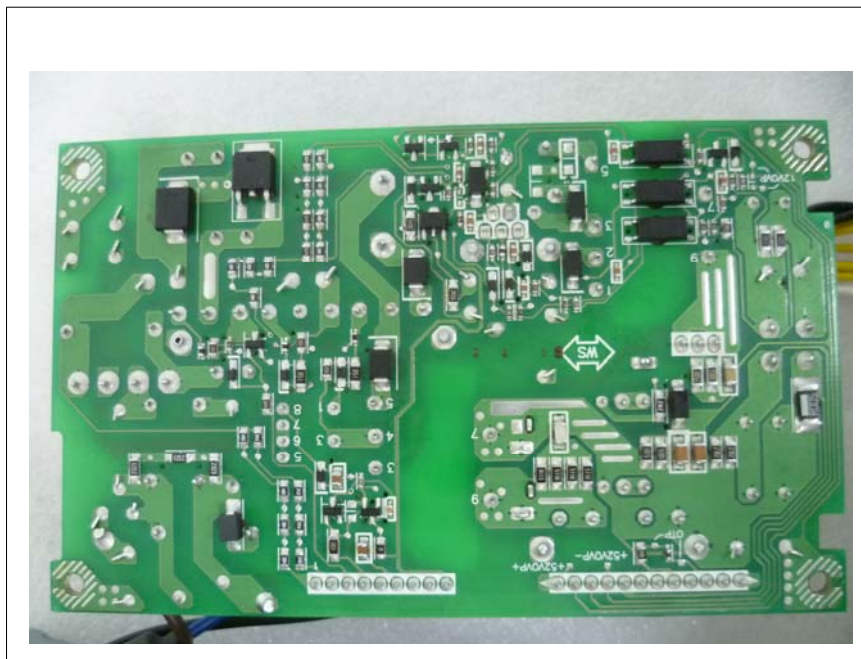
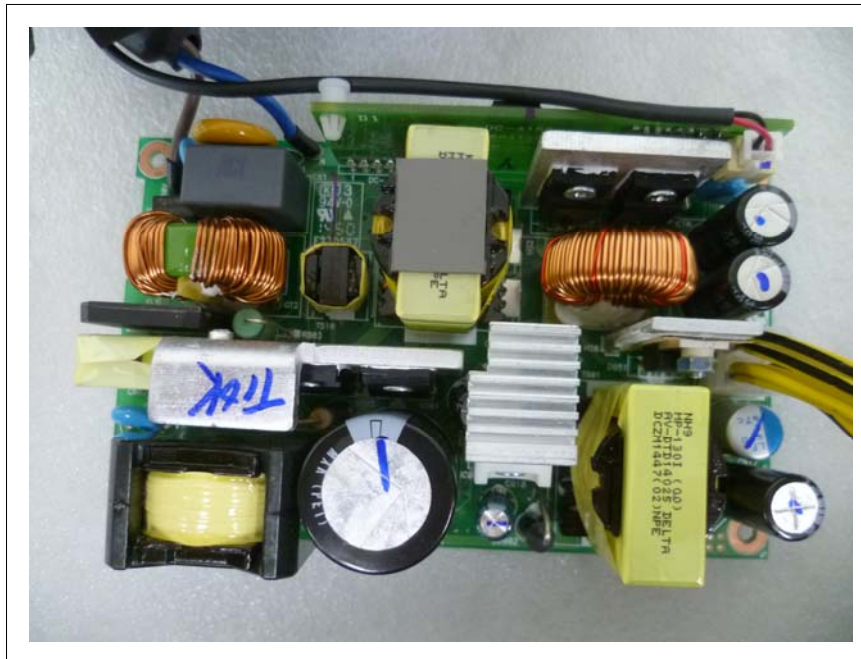
[BOTTOM VIEW]

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○ Power supply



○ Power Supply - Main Board



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Appendix A - Schematics/Block Diagram

Please see attached document(s).



Appendix B - User's Manual

Please see attached document(s).